UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2006 question paper

9691 COMPUTING

9691/01   Paper 1, maximum raw mark 90

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

* CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2006 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 **(a)** -Interview key personnel
-allows questions to alter according to the answers given/confidential information
-Questionnaires
-allows a large number of people to give their views in a short period of time/maintains anonymity
-Meetings
-Partially combines the good points of interviews and questionnaires/allows discussion between
 people in meeting
-Collect present documentation
-shows what form the input and output is expected to take
-Observe present system in action
-can see first hand/unjaundiced view of what actually happens
(1 per -, max 3 pairs, max 6)   (6)

   (b) -Corrective maintenance
-to correct faults that are found after commissioning
-to debug errors in the code
-Adaptive maintenance
-to institute necessary changes
-because of changes in the way the organization works/tax changes/law changes
-Perfective maintenance
-to improve the performance of the system
-despite the fact that it does all it needs to
(1 per -, max 2 per type, max 4)   (4)

2 **(a)** -The times that the workers come and go are collected as a batch
-Processing cannot be started until all the data is collected
-Large amounts of data
-Data is all very similar
-needing similar processing
-processing is simple
-Once processing starts no human intervention is necessary
-Results are not time sensitive
-Pay must be calculated for **all** workers
(1 per -, max 4)   (4)

   (b) **(i)** -Records are stored in a logical order
-e.g. alphabetic/numeric
-in this case in order of employee number
(1 per -, max 2)   (2)

        (ii) -All the records have to be updated
-Necessary to compare each record with its entry in a transaction file
-Which will also be in order
-No need apparent for direct access to records
(1 per -, max 2)   (2)

   (c) -e.g. Playing a computer game
-Because the latest input must be processed before the next output.   (2)

3 (a) (i)   8,2
             4

   (ii)   6,0
          6   (2)
          (Note: Allow one in each case if extra is given, e.g. A = 8)

(b)   WHILE CONTROL SYSTEM ON DO
       WHILE M NOT TRIGGERED DO
       IF FAN ON   THEN FAN OFF
       ENDIF
       ENDWHILE
       IF T>D   THEN   IF FAN OFF   THEN FAN ON
                                        ENDIF
                ELSE   IF FAN ONTHEN FAN OFF
                                        ENDIF
       ENDIF
       ENDWHILE
       END
       Mark points:
       -Loop for system switched on
       -Loop to wait for M to be triggered
               -Switch off fan in loop
       -Condition statement re. temperature
               Two correct outcomes: -Fan on
                                            -Fan off
               -Condition to reverse current state of fan
       -Correct positioning of loops
       -Correct structure (e.g. End statements
       (1 per -, max 6)   (6)

4 (a) (i)   One that gives information but cannot have that information changed

   (ii)   One where data held can be altered by the user.   (2)

(b)   -Who will be using the interface
       -What experience/knowledge do they have
       -What is the system requirement/time sensitive or not
       -What is the information that needs to be shown
       -How much information is needed
       -What is the best way to show the information required
       -Colours that should/should not be used
       -What other forms of output are sensible/possible in the environment of the control room
       -What technology is available
       -Layout/language to be used
       (1 per -, max 6)   (6)

5 (a) **(i)** The transfer of data in only one direction.

       (ii) The transfer of data in both directions but only one direction at a time

      (iii) The transfer of data one bit at a time down a single (wire)

      (iv) The transfer of data down a number of wires/bits being sent simultaneously/normally one byte at a time. (4)

(b) -Buffer filled from primary memory
-Processor carries on with other task while
-Hard drive empties buffer and stores data
-When buffer empty
-Interrupt sent to processor (from hard drive/buffer)
-requesting buffer to be refilled
-Processor decides according to importance of interrupt
-whether to suspend current job and carry out interrupt or
-to store interrupt for later execution
-Processor refills buffer from primary memory
(1 per -, max 6) (6)

(c) -Parallel
-because the processor requires the data to be downloaded as quickly as possible
-Half duplex
-Because there needs to be communication in both directions (4)

6 (a) **(i)** -Hard copy necessary so that the text can be read easily
        -so that it is easily portable
        -Some people find looking at a screen for long periods uncomfortable
        -Easier to record notes on hard copy
        (1 per -, max 2) (2)

      (ii) -Electronic form so that it can be sent from person to person without delay
        -so that it can be copied easily
        -so that corrections can be easily made
        (1 per -, max 2) (2)

(b) **(i)** -No need for expensive central offices/Can employ people who live in cheaper areas of the country so wages lower/Should be a more contented workforce, so better work
        -However, difficult to coordinate work/Difficult to supervise work being done
        (1 per -, max 2) (2)

      (ii) -Does not need to travel to work/More control over working times/more time for leisure, family/cost of living less
        -Does not have social experience with other workers/difficult to be noticed by superiors and hence earn promotion, bonuses/distractions from family
        (1 per -, max 2) (2)

     (iii) -Less pollution because of fewer journeys to work/less need for infrastructure/reduces pressure on centres of major cities
        -less social cohesion/need for new legislation to cover new practices and data handling
        (1 per -, max 2) (2)

(c) -Communications software/dial up software…
-so that the individual systems can communicate with head office over the medium
-Network cards…
-so that the machine can communicate on the WAN
-Modem/ISDN line (or other communications medium)…
-so that machine can access the network
(1 per -, max 1 hardware and 1 software, max 4) (4)

7 (a) -Circuit switching involves keeping a fixed circuit open for the duration of the message
-Advantage is that message arrives without having to be reordered
-Packet switching sends individual packets onto the network to find their way independently of each other
-Advantage is that message is difficult to hack/large part of network not tied up for long period/can circumvent blocked routes. (4)

(b) (i) -(A member of the) character set that a computer recognizes
-Character on a standard keyboard
-Standard to many machines
-Stored in binary as…
-7,8,9,16 bits per character
(1 per -, max 2) (2)

(ii) -Check sum is the result of adding all the bytes of data (and ignoring the carry out of the byte)
-The result is sent along with the data and
-Checked against the total calculated as the data arrives
-If the two totals differ then a transmission error has occurred
-Parity involves every byte having its bits adding to either an odd or even total
-Type of parity must be agreed between sender and recipient
-Use of a parity bit to make each byte the correct type
-If bit is changed during transmission then the sum of bits will not match parity type
(1 per -, max 2 per type of check, max 4) (4)

8 -Custom-written is specially written for that application
-Off-the-shelf is generic software that needs tailoring for the application
Company would choose off-the-shelf software because:
-Cheaper than custom-written
-Available in much shorter time because does not need to go through whole writing process
-Increased functionality over time
-Compatible with other software
-Based on software that is widely known so training is easier
-Fewer bugs will be found because of the wide use of the software, the bugs will already have been found by other users
(1 per type, max 2 for reasons, max 4) (4)

9 (i) -To divide up the surface of a disk into more easily manageable sectors
-Copy editor will use a hard disk which will need to be formatted before being used/to store texts (2)

(ii) -To manage the files that are stored on a computer system
-Copy editor would need to save/open/delete/sort files held on the system. (2)

(iii) -Used to control communication between computer and peripherals
-Controls formatting and fonts of text sent to the printer. (2)

(iv) -Reduces size of files without the loss of any detail
-To speed up the transfer of files which are very large (2)

(v) -Used to check any files on or entering the system for viruses
-Copy writer will **use the communications regularly** and hence files will be subject to attack/many files being received. (2)